



# **Outlook and Challenges of Hydrocarbon Imports into California**

Platts

California Fuel Supply Conference

Long Beach, CA

March 26, 2007

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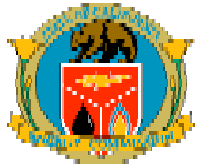
*Fuels and Transportation Division*

*California Energy Commission*



## Presentation Topics

- Petroleum infrastructure and regional product flows
- Crude oil – declining CA production & increasing imports
- Factors impacting crude oil import forecast
- Transportation fuels – growing demand & increasing uncertainty
- Factors impacting transportation fuel import forecast
- Next steps for petroleum infrastructure assessment
- Petroleum versus containers
- Petroleum infrastructure - significance to state
- Summary



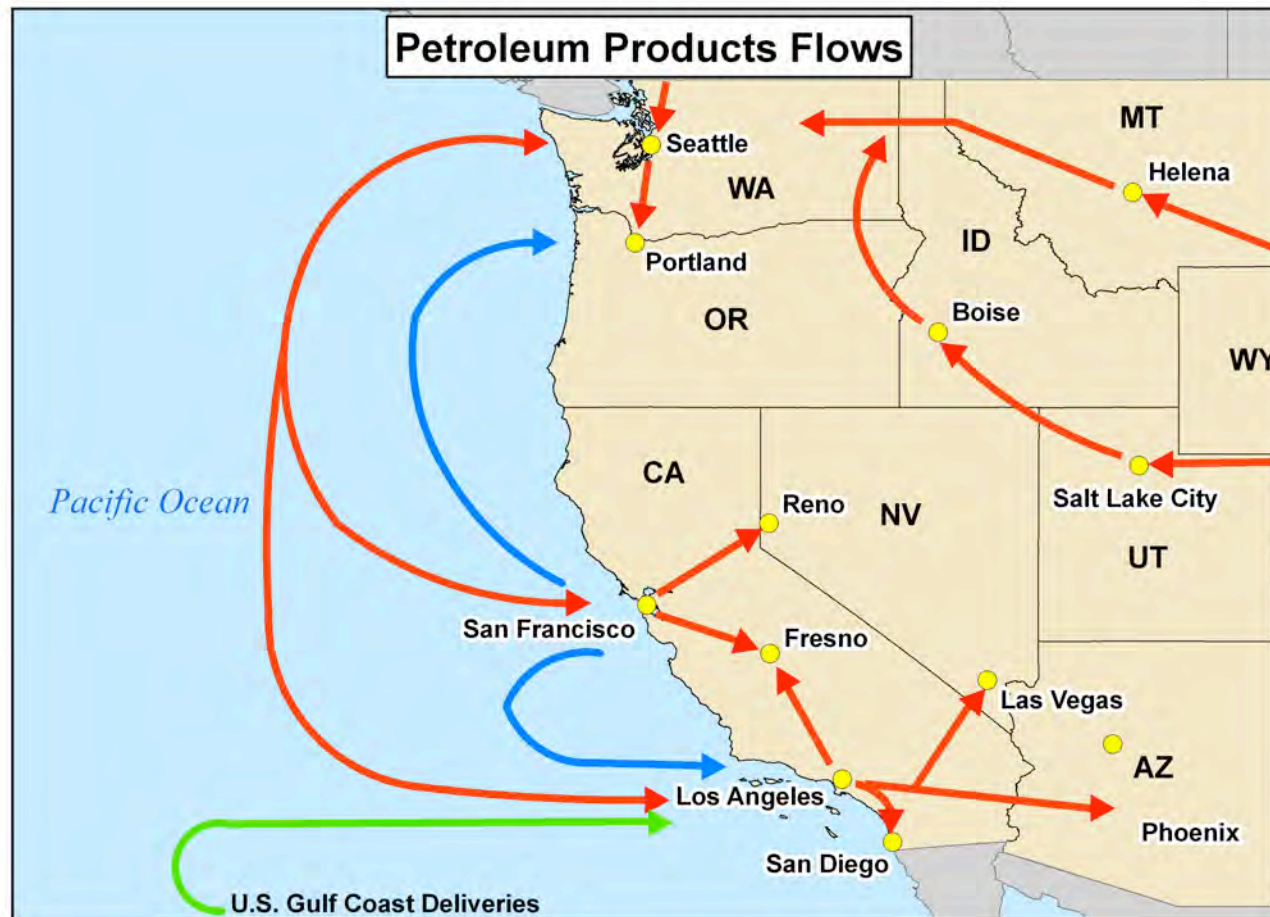
# California's Petroleum Infrastructure



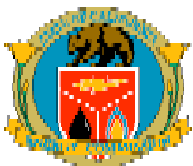
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# Interstate Dependence for Transportation Fuel Supply



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## West Coast Petroleum Flows



- 1 Foreign Imports into Northern California
- 2 Foreign Imports into Southern California
- 3 US Gulf Coast Imports into Northern California
- 4 US Gulf Coast Imports into Southern California
- 5 Ship/Barge - San Francisco to Los Angeles
- 6 Ship/Barge - San Francisco to Portland
- 7 Ship/Barge - Washington to Los Angeles
- 8 Kinder Morgan - San Francisco to Chico
- 9 Truck - Chico into Southern Oregon
- 10 Kinder Morgan - San Francisco to Reno
- 11 Kinder Morgan - San Francisco to Fresno
- 12 Kinder Morgan - Bakersfield to Fresno
- 13 Truck - Imperial into Western Arizona
- 14 Kinder Morgan - Los Angeles to Las Vegas
- 15 Kinder Morgan - Los Angeles to San Diego
- 16 Kinder Morgan - Los Angeles to Imperial
- 17 Kinder Morgan - Los Angeles to Phoenix
- 18 Kinder Morgan - Los Angeles to Tucson
- 19 Kinder Morgan - Tucson to Phoenix
- 20 Kinder Morgan - El Paso to Tucson
- 21 Longhorn Pipeline - Houston to El Paso
- 22 Ship/Barge - San Francisco to Eureka

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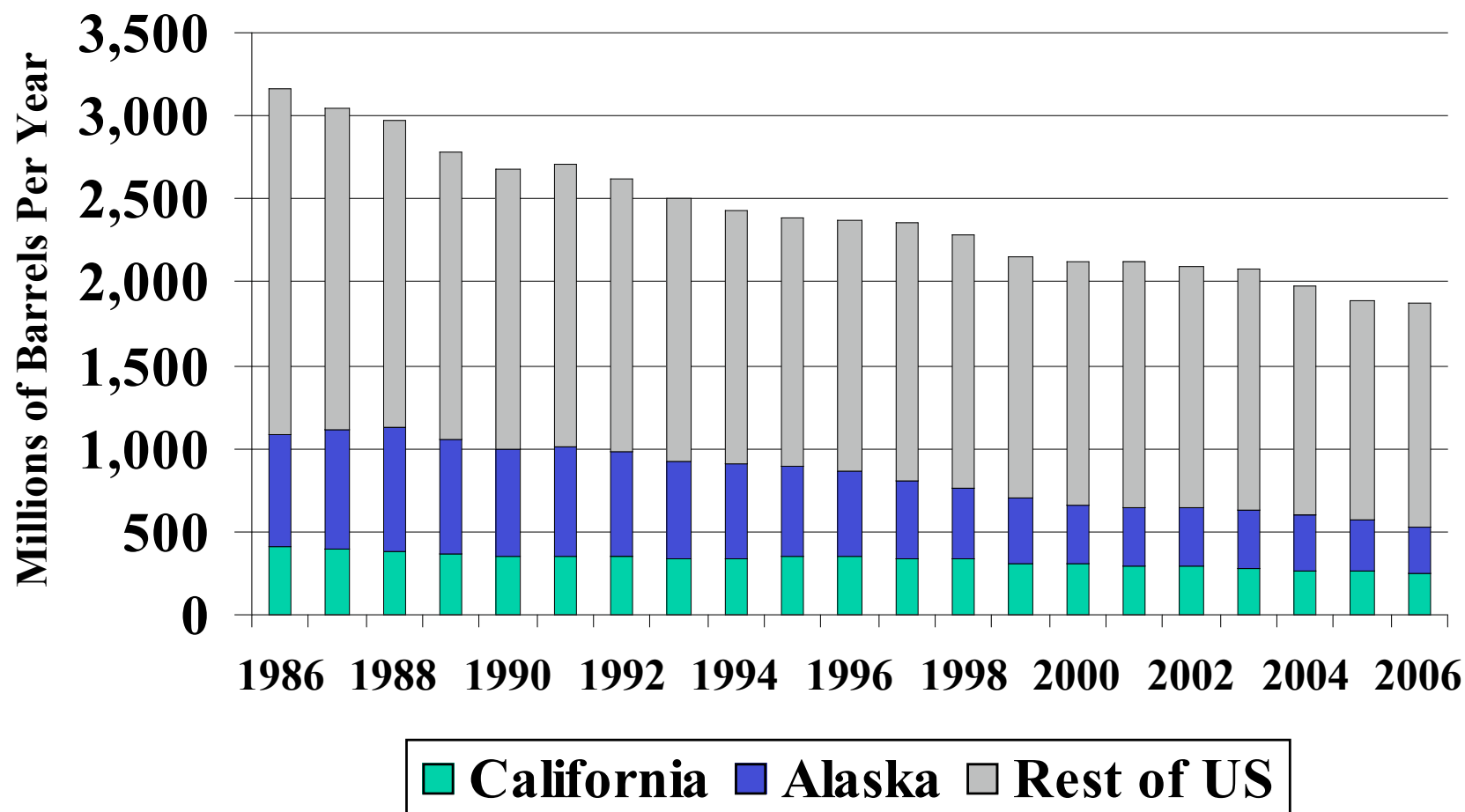
# Crude Oil



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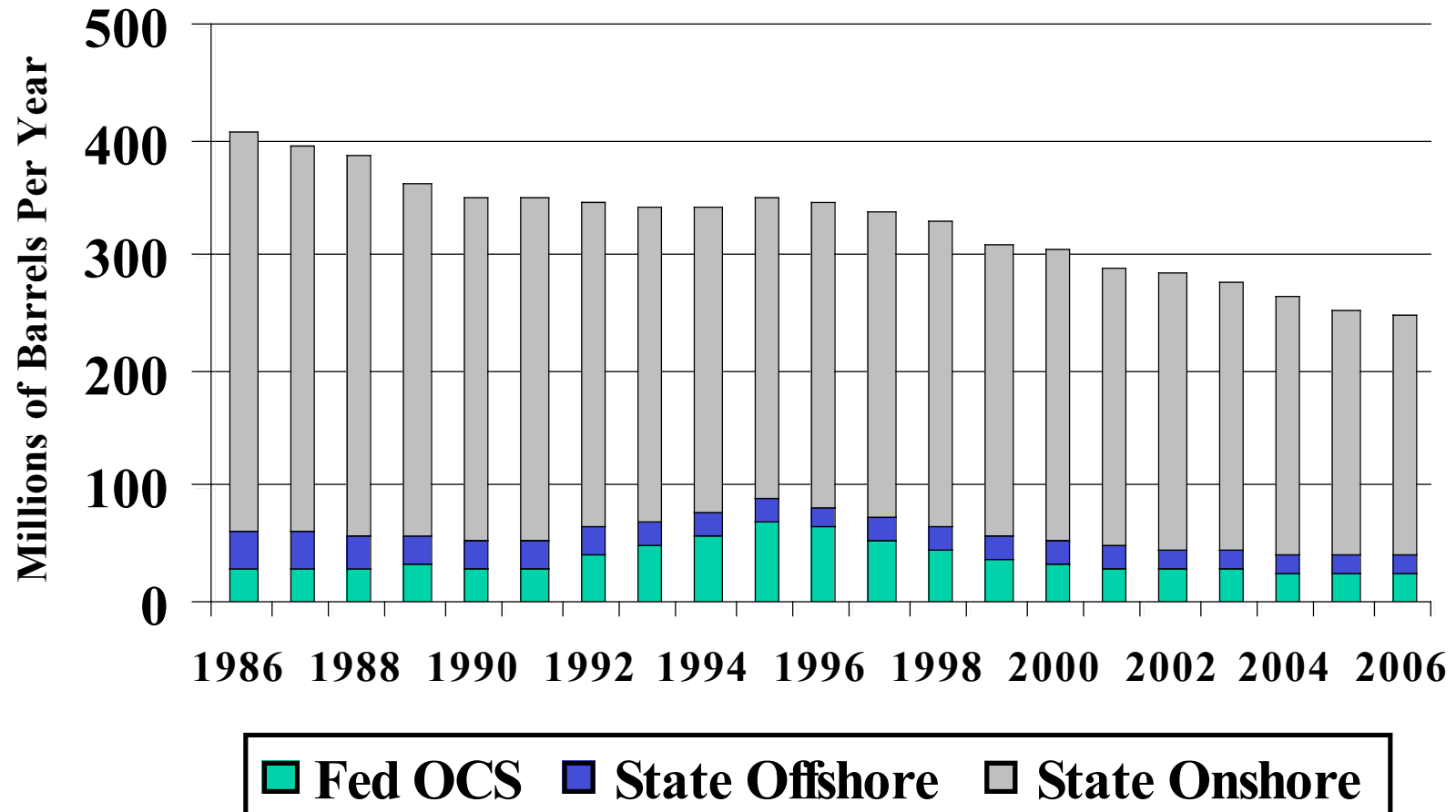
## United States Oil Production 1986 to 2006



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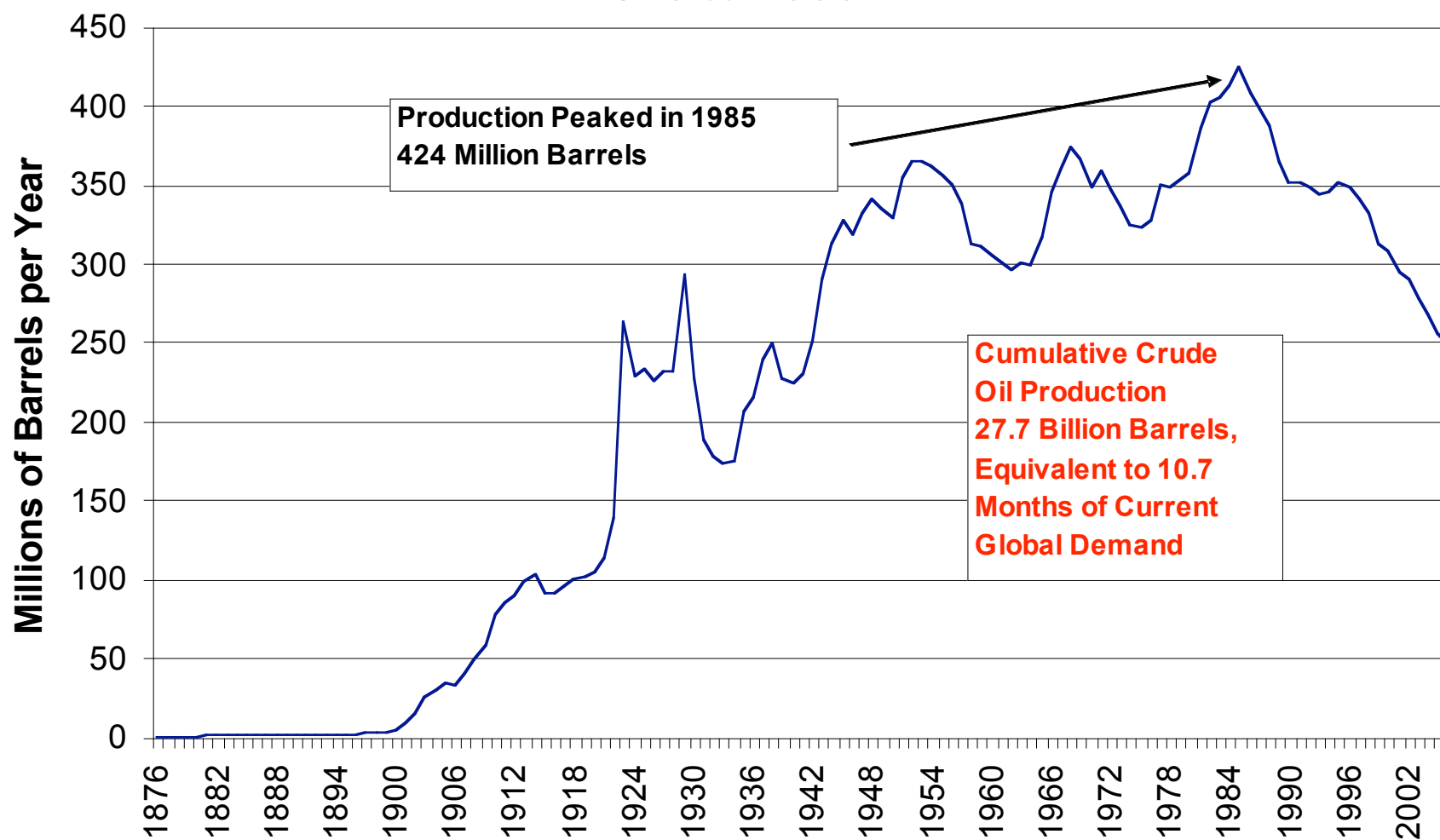
## California Oil Production 1986 to 2006







## California Oil Production 1876 to 2006

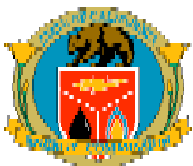


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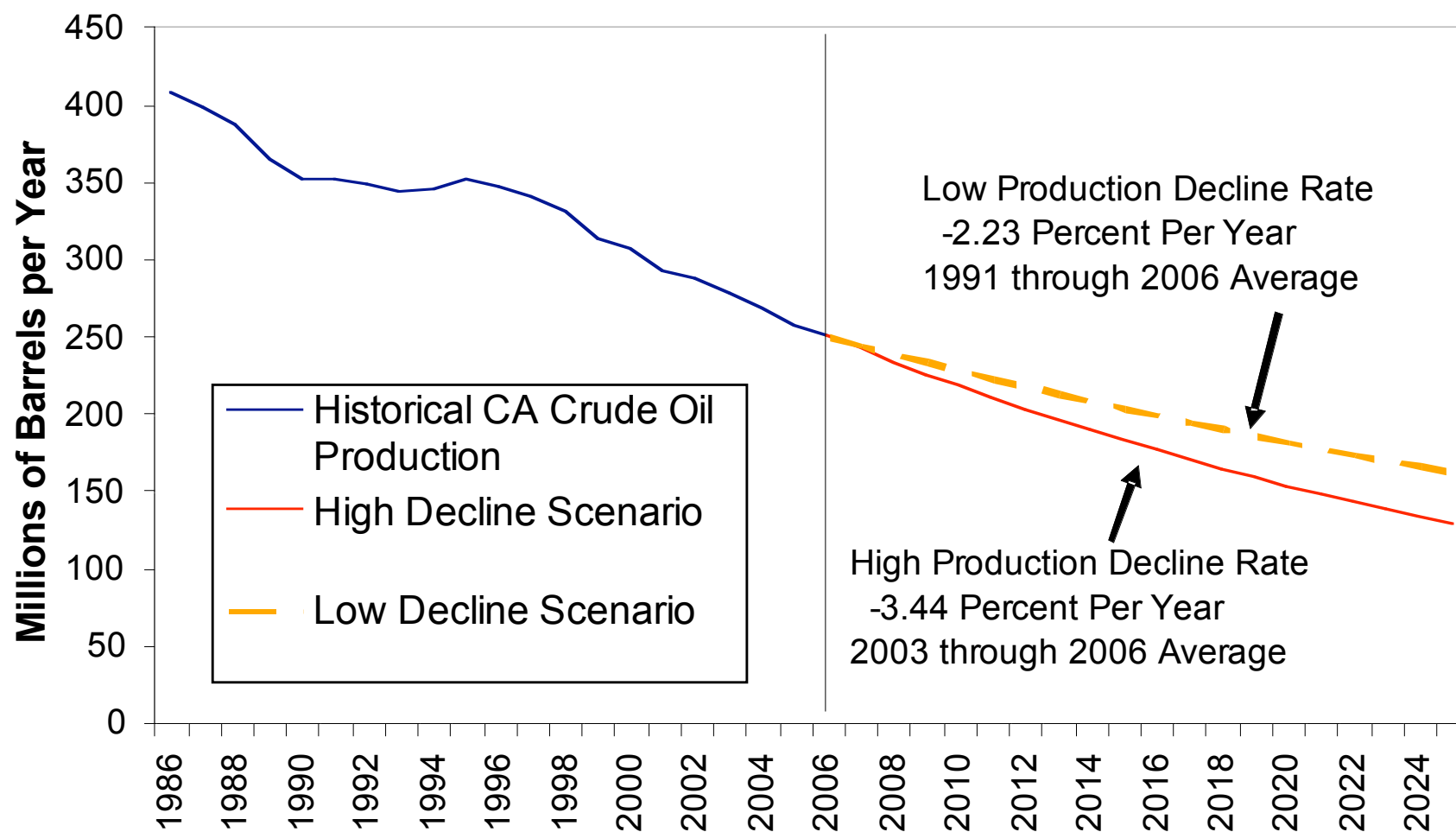


## Recent Crude Oil Production Trends

- Global crude oil production 31.1 billion barrels in 2006, roughly 85 million barrels per day
- 2006 U.S. crude oil production 1.87 billion barrels or 5.1 million barrels per day
- CA crude oil production in 2006 was 250 million barrels or 685 thousand barrels per day
- California crude oil production has declined 39% since 1986, Alaska 60% and the rest of U.S. by 35%
- Crude oil production decline expected to continue, despite sustained higher prices and significant drilling activity
- Rate of decline has been greater over the last couple of years compared to longer trends
- Declining domestic oil production will need to be replaced with increased imports of crude oil from foreign sources



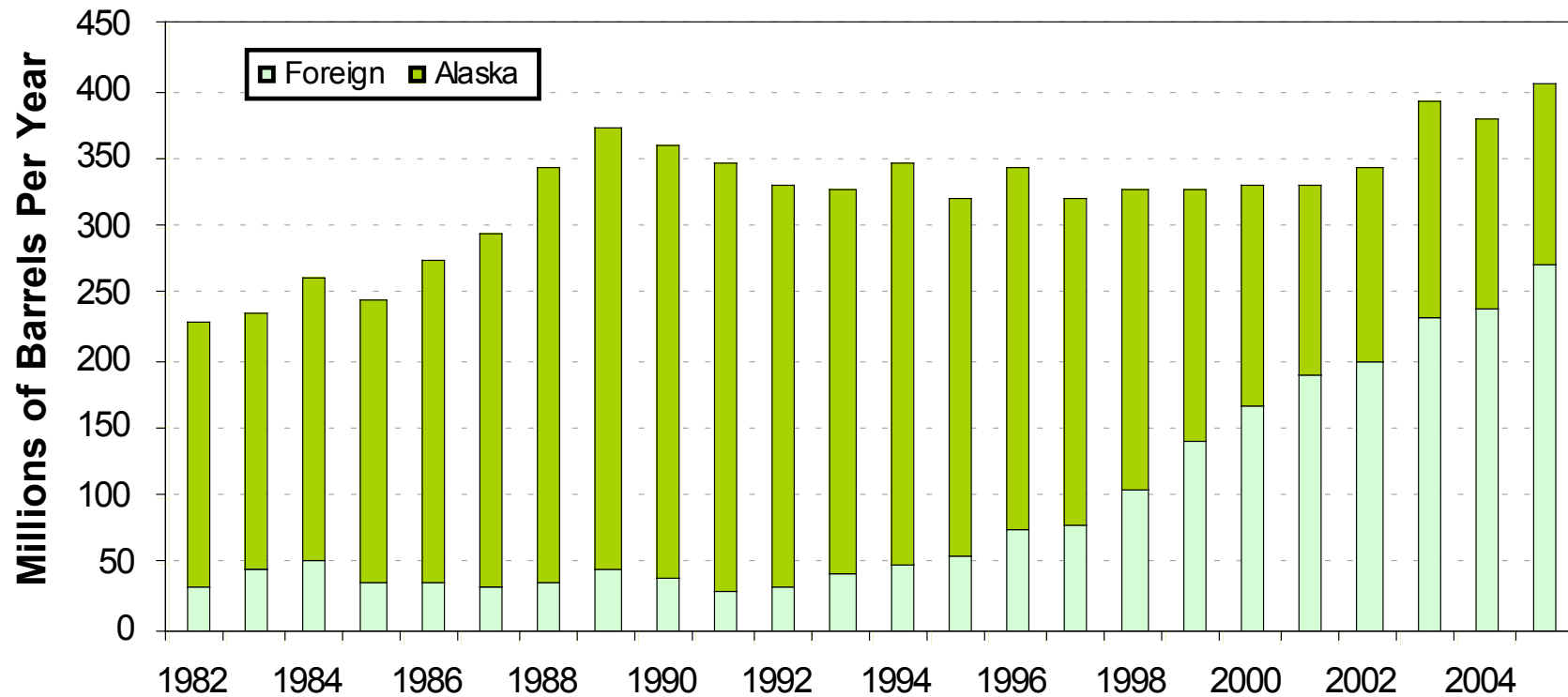
## California Crude Oil Production Decline Forecast 2007-2025



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## California Crude Oil Imports 1982 through 2005



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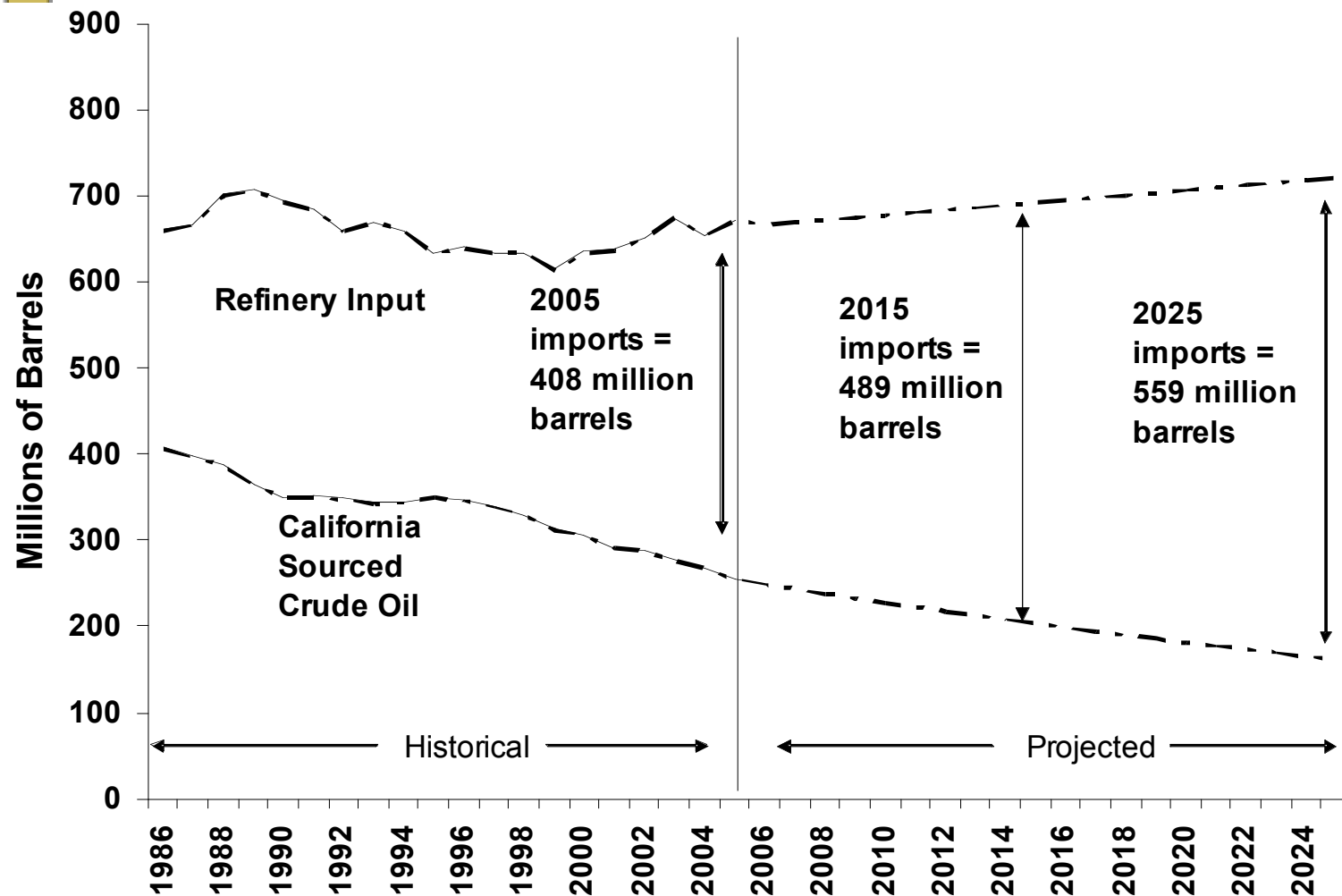


## California Crude Oil Imports – Historical

- Imports of crude oil have increased as California crude production fell and refineries processed additional oil
- Total imports of crude oil have increased 18% between 1996 and 2005
- Imports of Alaska crude oil declined a total of 50% between 1996 and 2005
- The largest increase has been for foreign crude oil imports
  - 15.6% per year increase
- What is the outlook for crude oil imports for California and what are the primary factors influencing the forecasts?



## California Crude Oil Imports – Low Forecast

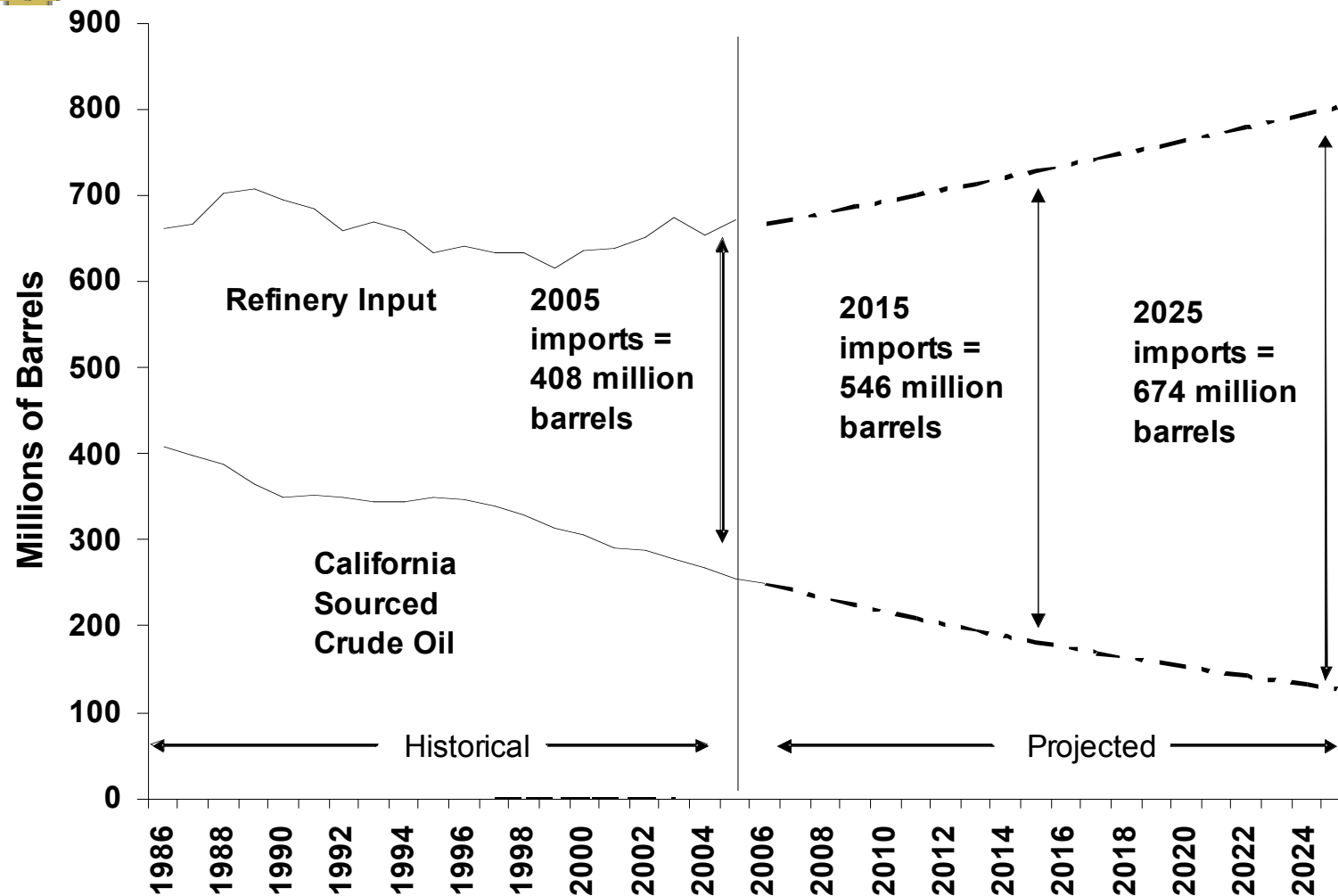


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## California Crude Oil Imports – High Forecast



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## California Crude Oil Imports - Forecast

- Crude oil imports are forecast to increase in California due to:
  - Continuing decline of local crude oil production
  - Gradual expansion of the capacity of California refineries to process crude oil – referred to as “refinery creep”
- The lower estimate for increased crude oil imports assumes that crude oil production declines at a slower pace (2.3% per year) & expansion of distillation capacity is at a smaller rate (0.4% per year)
- The higher estimate for incremental crude oil imports assumes that the production of California crude oil declines at a steeper pace (3.4% per year), while refiners expand distillation capacity at a higher rate (nearly 1% per year)



## Crude Oil Imports – Entire State

Incremental California Crude Oil Imports - Millions of Barrels				
Distillation Capacity Growth Rate	Low Rate of Crude Oil Decline - 2.2%		High Rate of Crude Oil Decline - 3.4%	
	2015	2025	2015	2025
0.41 Percent	81	151	102	185
0.70 Percent	99	191	120	226
0.98 Percent	117	232	138	266

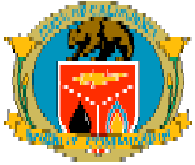
- Southern California is forecast to receive 60% of the crude oil imports



## Crude Oil Imports – Southern California

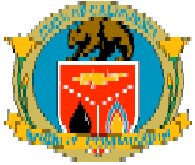
Incremental <b>S. Calif.</b> Crude Oil Imports - Millions of Barrels				
Distillation Capacity Growth Rate	Low Rate of Crude Oil Decline - 2.2%		High Rate of Crude Oil Decline - 3.4%	
	2015	2025	2015	2025
0.41 Percent	49	91	61	111
0.70 Percent	59	115	72	135
0.98 Percent	70	139	83	160

- Southern California crude oil imports are forecast to increase by 49 to 83 million barrels per year by 2015, an average increase of 134 to 227 thousand barrels per day (TBD)
- Longer term, incremental imports of crude oil for the region are forecast at 91 to 160 million barrels per year by 2025, roughly 249 to 438 TBD more than 2005 levels



## Factors Impacting Crude Oil Import Forecast

- Distillation capacity growth rates may plateau
  - AB 32 could defer or eliminate distillation expansion plans
  - Although crude oil imports would be reduced compared to the forecasted volumes, imports of transportation fuels could be increased as a direct consequence
- New technology to reduce decline rate for California oil production
  - Expanded offshore development from existing platforms
  - Long-reach directional drilling from on-shore locations
  - Increased injection of CO<sub>2</sub>



## California Crude Oil Imports - Summary

- Crude oil imports continue to increase because California crude oil production is declining and refineries are processing greater quantities over time
- Crude oil imports are forecast to increase by 81 to 138 million barrels by 2015, an increase of between 20% and 34% compared to the levels of imported crude oil in 2005
- Reducing the rate of demand growth for traditional transportation fuels (gasoline, diesel and jet fuels) ***will not*** have any appreciable impact on crude oil imports
- Over the longer term, any reduction in demand for traditional fuels will likely result in a decrease of imported transportation fuels, rather than a decrease in crude oil processing





# California's Transportation Fuel Demand

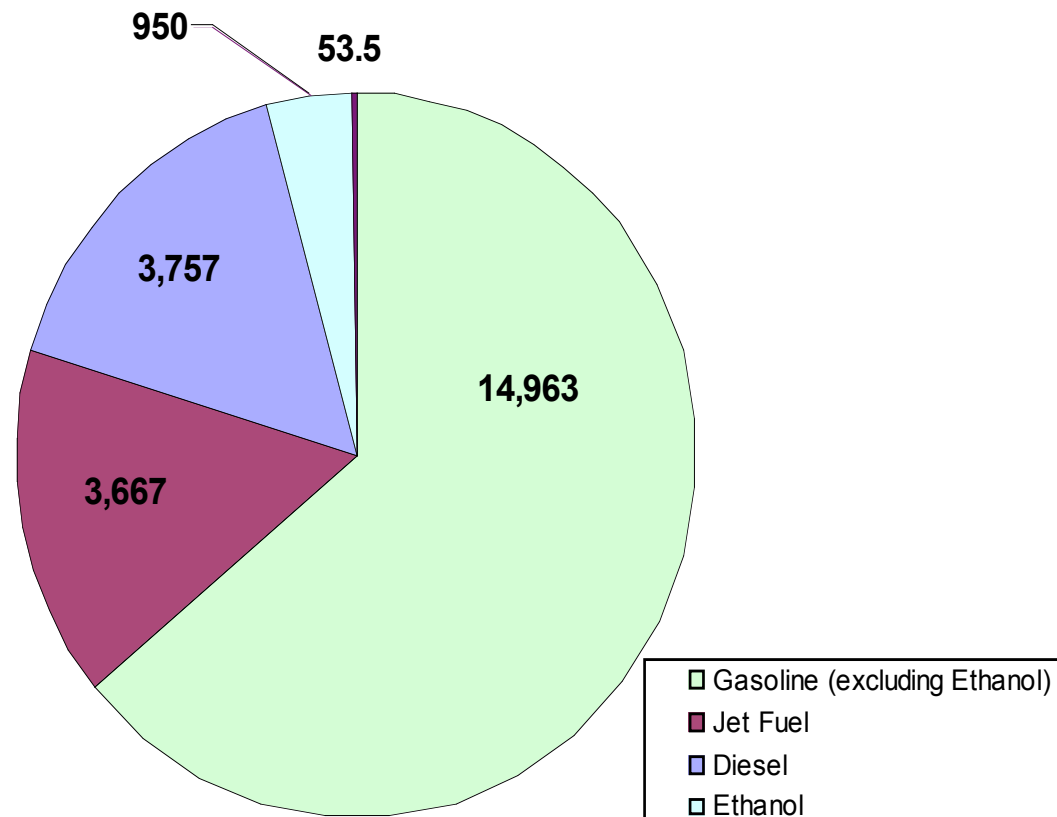


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## 5 Percent of California's Transportation Fuels Are From Sources Other Than Gasoline, Diesel & Jet Fuel

**2005 Demand for Petroleum and Alternative Fuels**  
(millions of gallons)

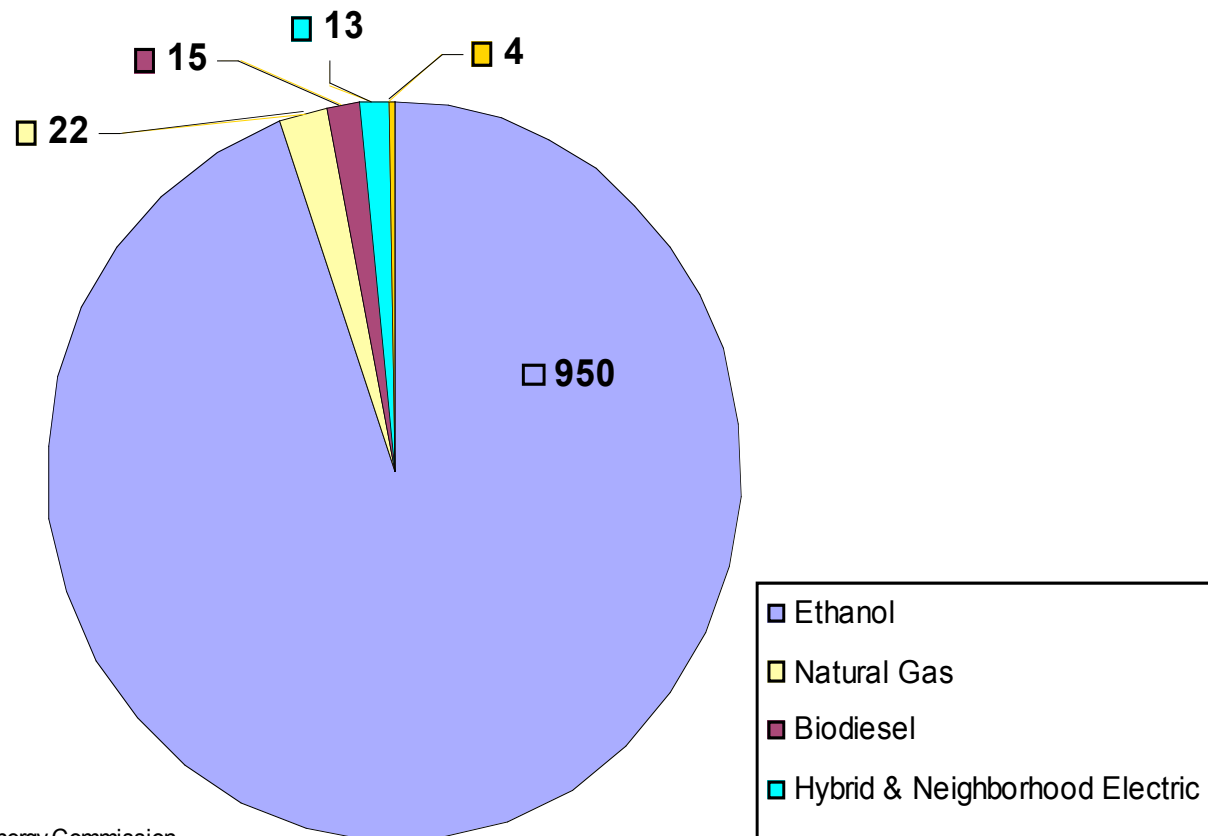


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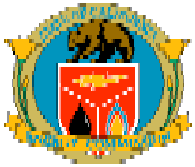


## Alternative Fuels are Dominated by Ethanol Fuel Demand

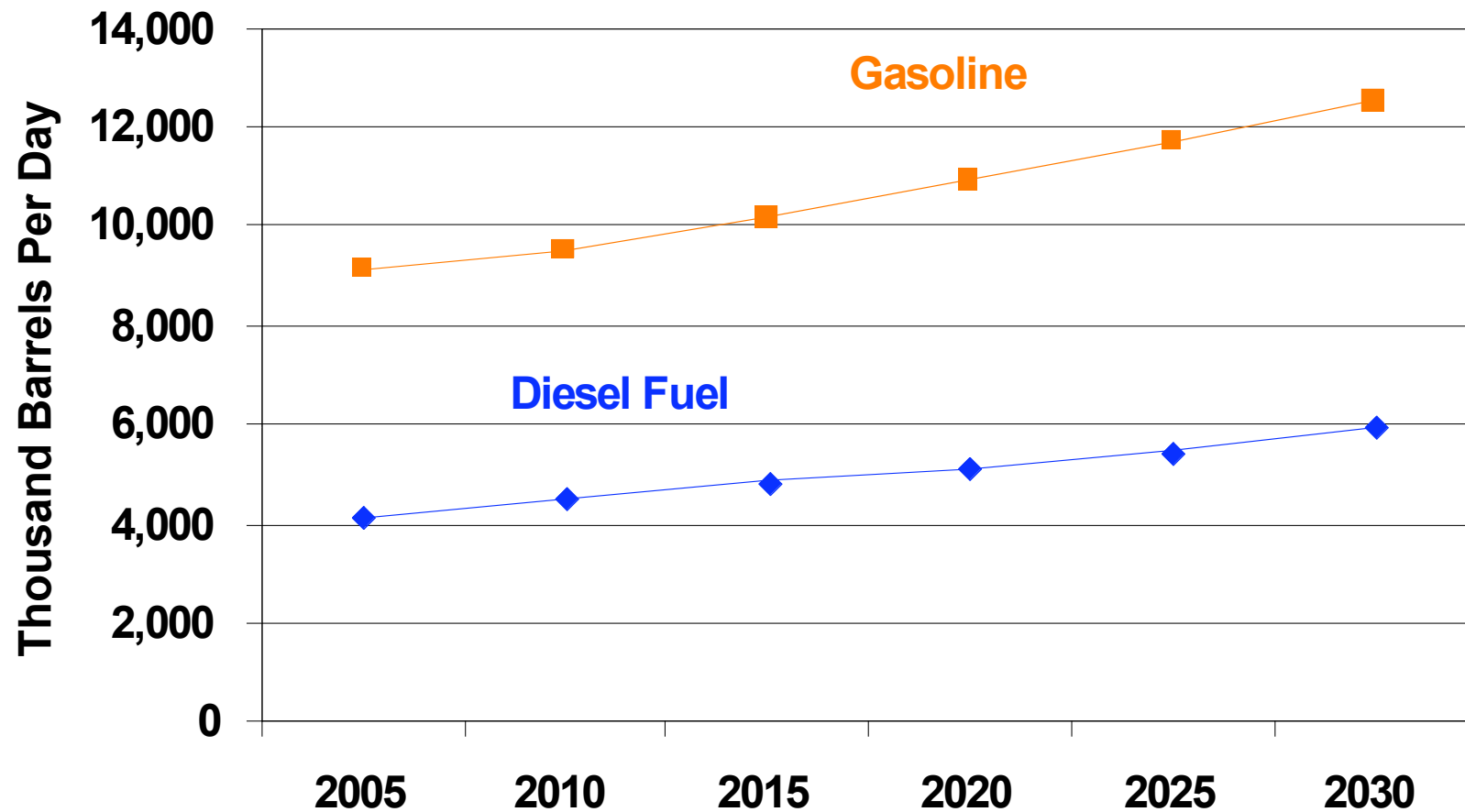
**2005 California Demand for Alternative Fuels  
(Millions of Gallons)**



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## U.S. Transportation Fuel Demand Historical & Forecast



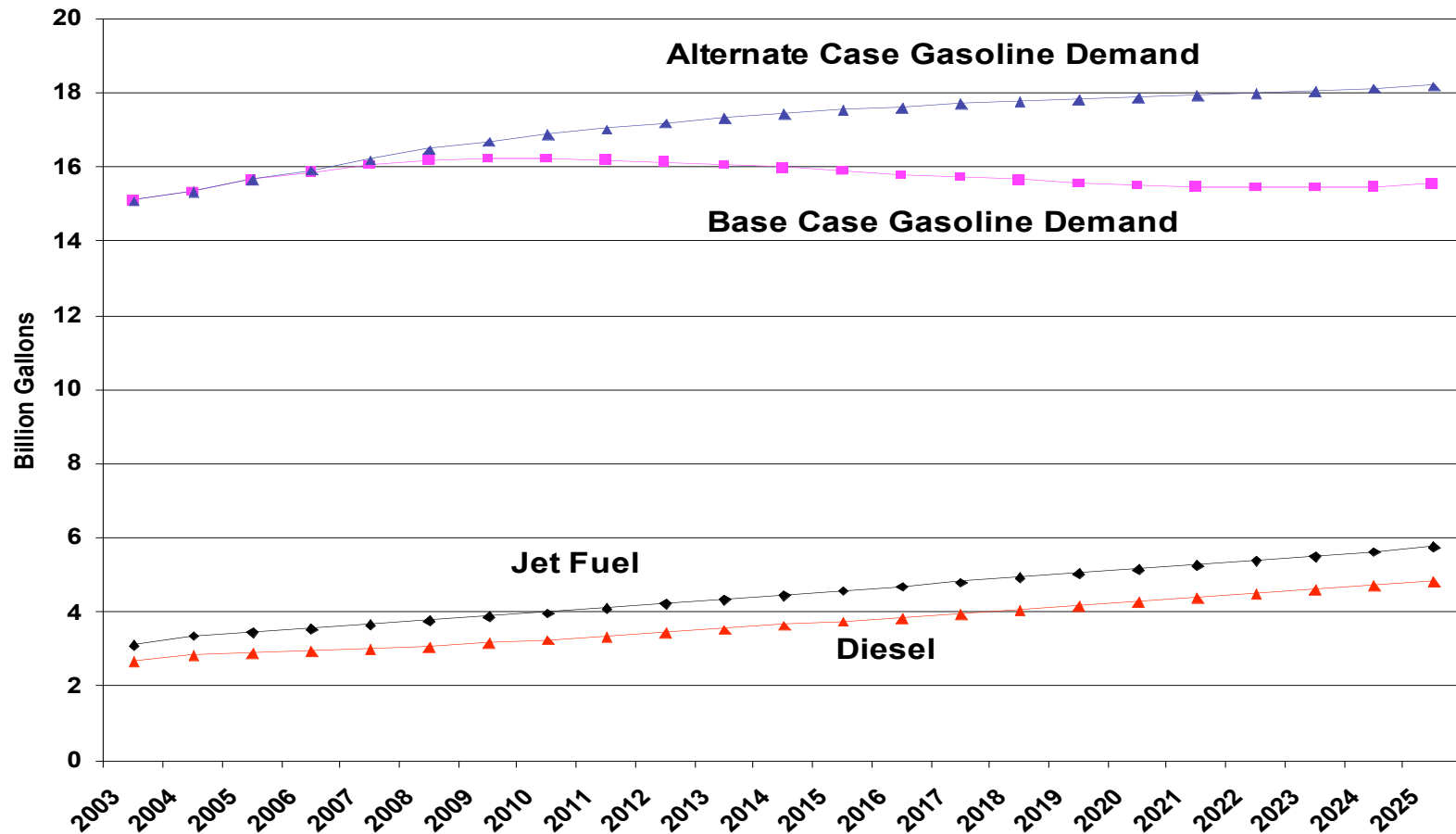
U.S. gasoline demand greater than diesel fuel but forecast to increase at lower rate (1.3 vs. 1.5 percent per year).

Source: EIA Annual Energy Outlook 2007

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# California Transportation Fuels Demand Forecast



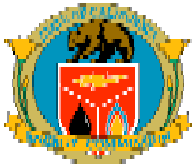
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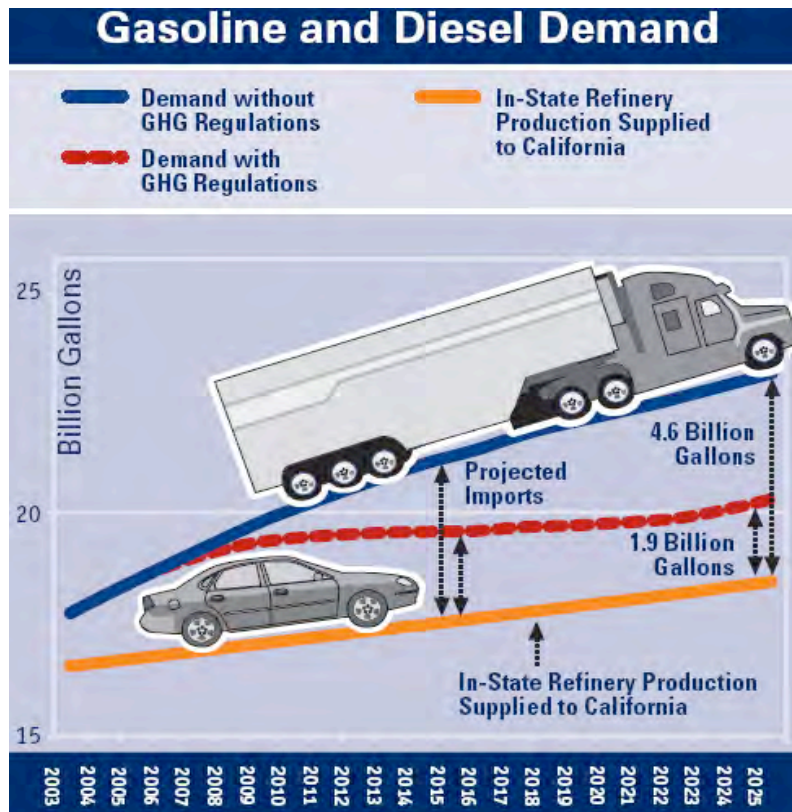
## California Transportation Fuels Demand Forecast

- Base case for gasoline assumes compliance with GHG reduction goals from Pavley legislation
- **Gasoline demand** in California grows by an average of 0.1% per year in the base case forecast and by 0.9% in the alternative forecast from 2005-2025
- **Diesel demand** grows by an average of 2.7% per year in the base case forecast and by 2.9% in the alternative forecast
- **Jet fuel** demand grows by an average of 2.9 % per year
- Average **fuel efficiency** rises by 33% over the forecast period in the base case and by 10% in the alternative case





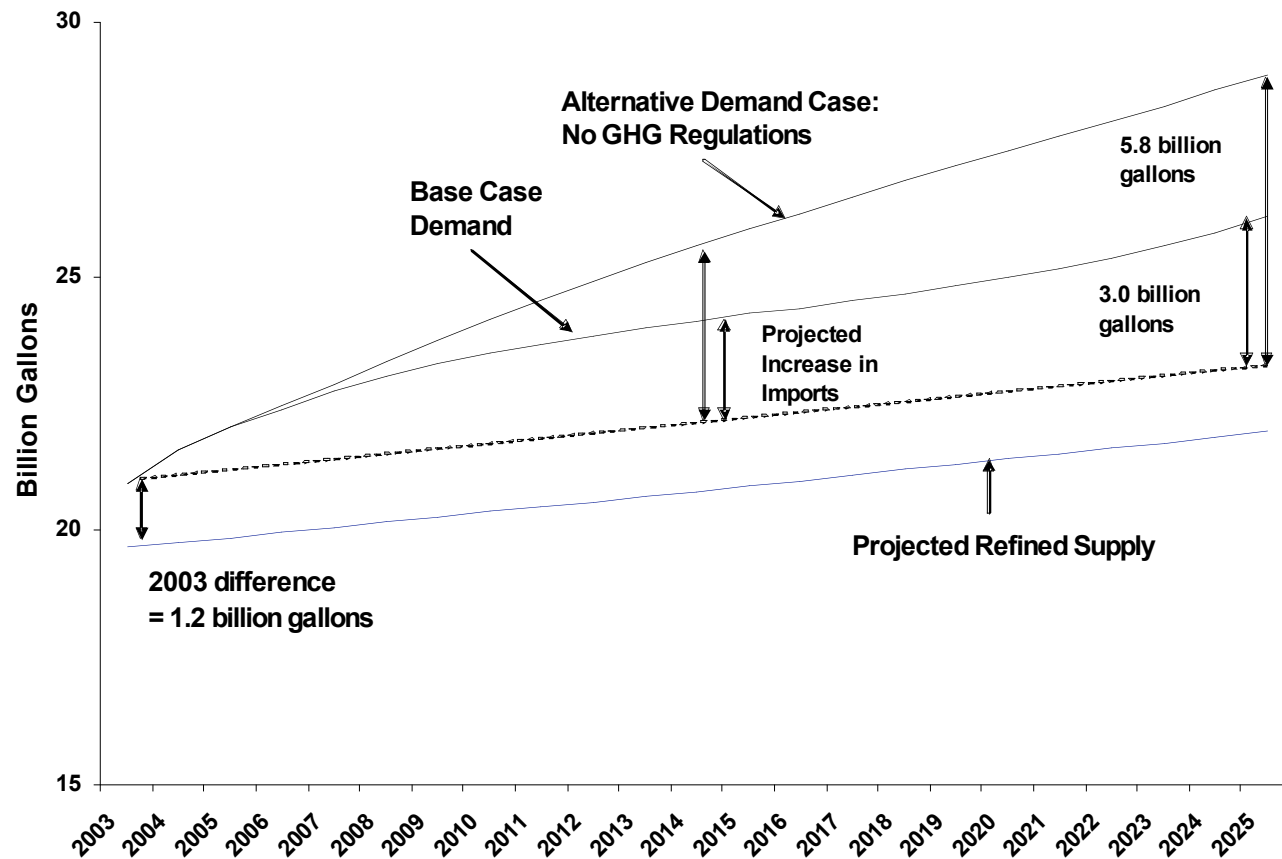
## 2005 California Transportation Fuels Demand & Import Projections



- 80 percent of the projected transportation fuel imports are expected to transit through the Ports of Los Angeles and Long Beach
- Demand growth rate for diesel fuel is forecast to be higher than that of gasoline
- Reducing dependence on petroleum through increased use of alternative fuels could help ease import demand for clean products over the longer-term, but have little impact on crude oil imports



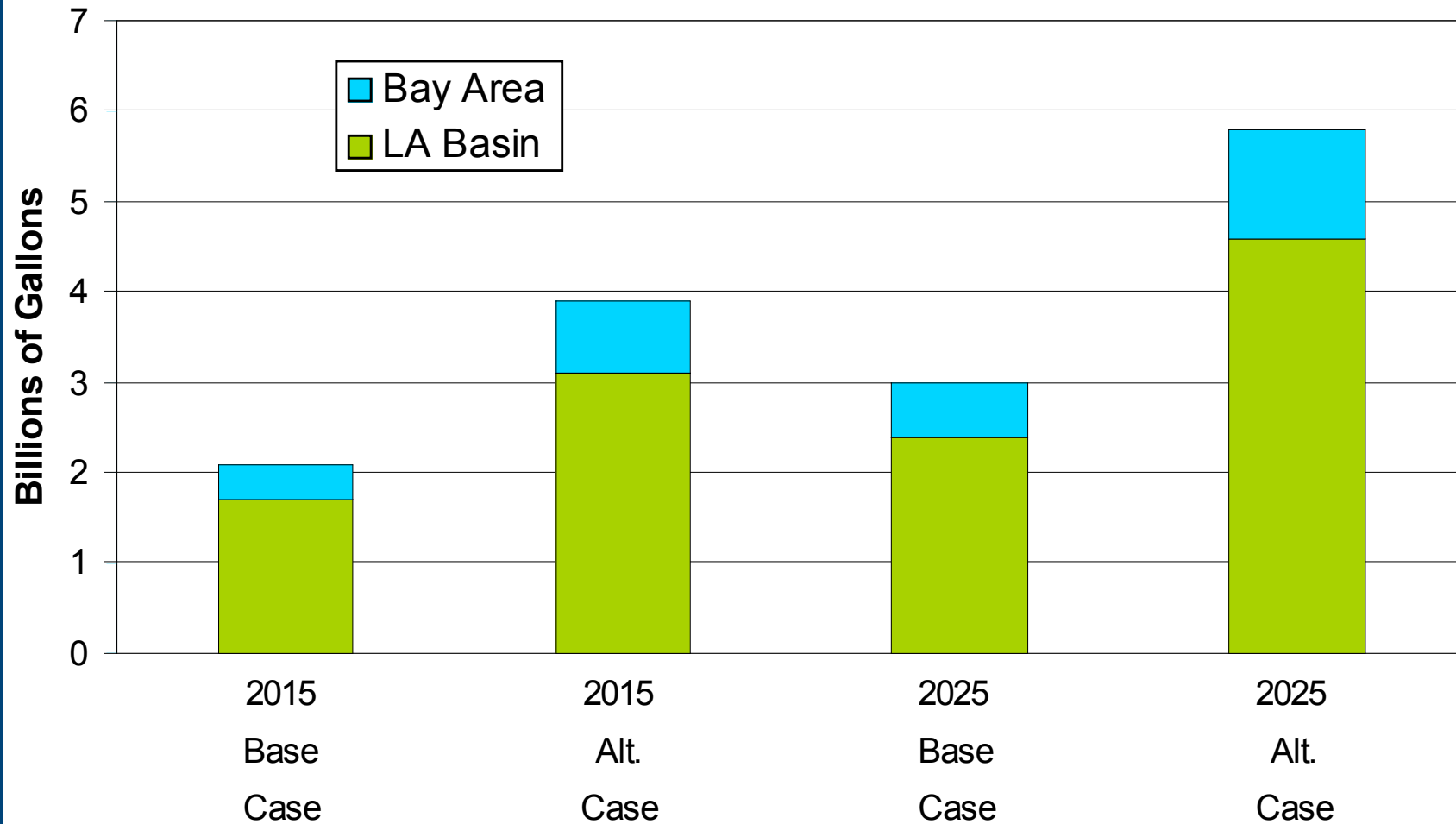
## Clean Fuels Imports - Forecast



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## Transportation Fuels - Incremental Import Forecast - Los Angeles Basin & Bay Area



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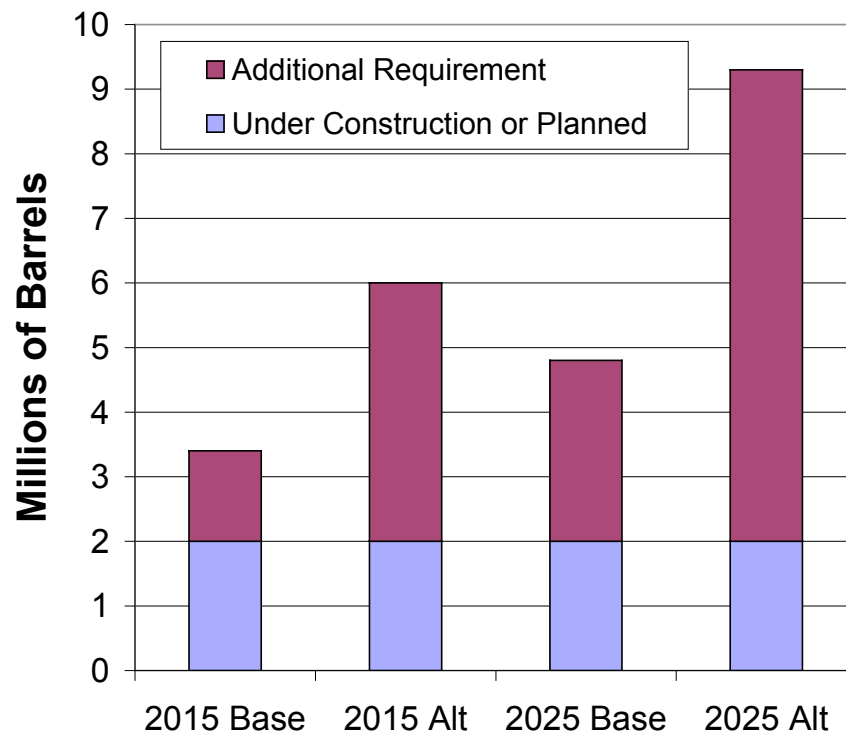


## Clean Fuels Imports - Forecast

- Annual production increase by California refiners, or “refinery creep,” projected to be 0.5%
- Base case demand forecast -- clean fuels imports increase over the 2004 level by
  - 2.1 billion gallons in 2015
  - 3.0 billion gallons in 2025
- Alternative forecast – clean fuels imports increase by
  - 3.9 billion gallons in 2015
  - 5.8 billion gallons in 2025
- Increased use of alternative fuels can reduce the projected imports of gasoline & diesel fuels, but will likely increase the forecasted imports of ethanol and other alternative fuels



## Additional Storage – Los Angeles Basin



- Assuming existing petroleum infrastructure capacity is retained, an additional 2.8 to 7.3 million barrels of new storage capacity will be needed in the Los Angeles Basin to handle to projected clean fuels imports
- If one of the proposed crude oil import terminals is constructed in the Los Angeles Basin, crude oil import capacity should be sufficient to handle the projected imports through 2015



## Factors Impacting Transportation Fuel Import Forecast

- Previous forecast
  - Somewhat dated and undergoing revision
  - Was limited to traditional transportation fuels (gasoline, diesel and jet fuels) – no alternative fuels
  - Did not account for demand growth in the neighboring states of Nevada and Arizona
- Revised forecast
  - Will include incremental imports to meet future increases in pipeline shipments to these destinations
  - Assessment of existing throughput capability of marine terminals
  - Possible AB 32 scenario, but may be too early in the process





## Factors – Alternative Fuel Imports

- Previous forecast included ethanol for blending in gasoline at a concentration of 6% by volume, assumed to be imported via rail cars from the Midwest U.S.
- AB 1007 process will provide strategies to achieve greater presentation of non-traditional transportation fuels
  - Displacement of gasoline with additional types of alternative fuels will increase marine infrastructure segregation and handling requirements
  - Modifications will likely be required, including improvements needed to receive feedstocks for bio-refineries
- Low Carbon Fuel Standard concept is yet to be developed but could include greater volumes of alternative fuels

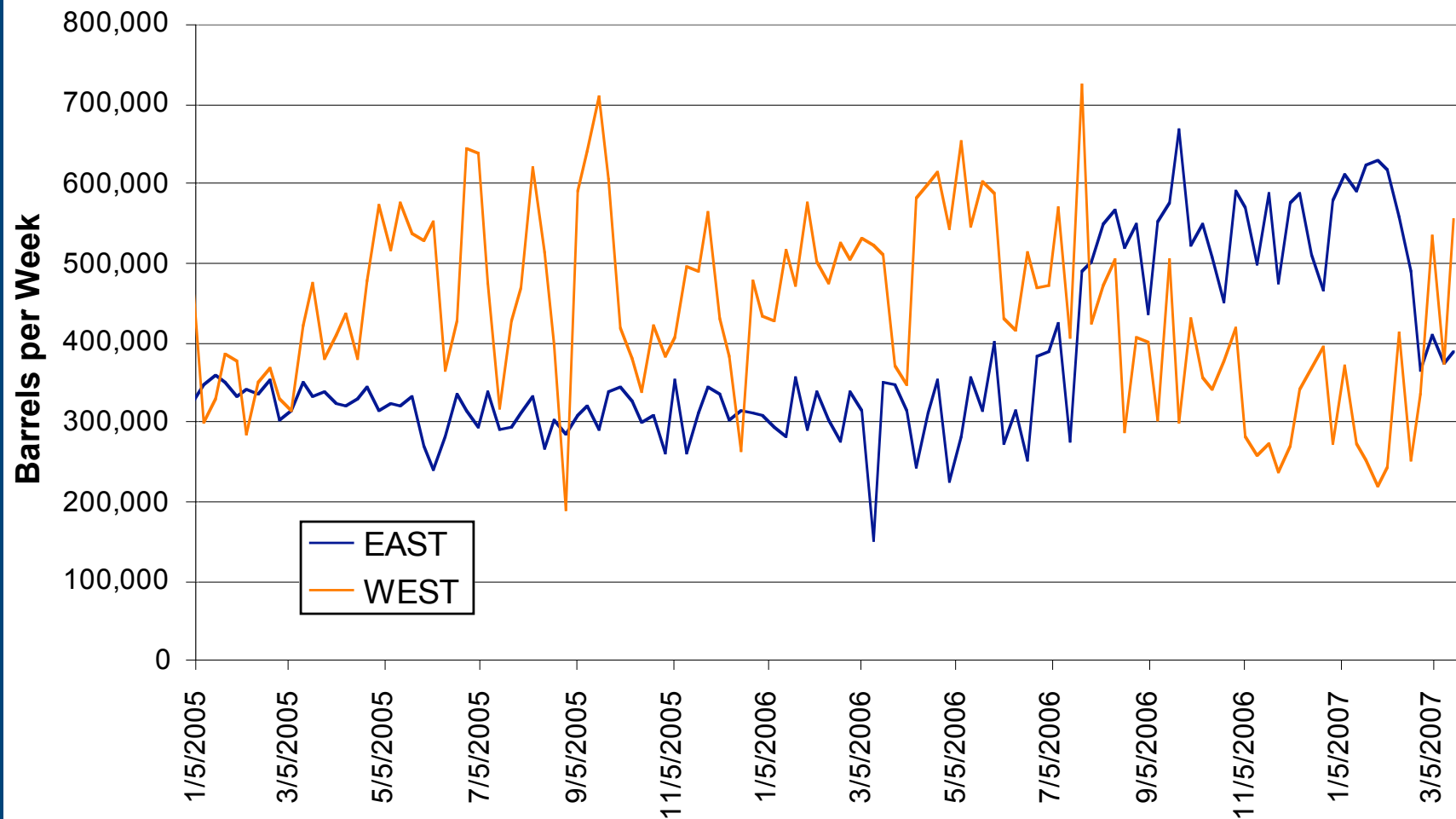


## Factors - Demand Growth In AZ and NV

- Although the demand for transportation fuels in Arizona and Nevada is less than that of California, the growth rates over the last couple of years have been higher
- Nevada receives nearly 100% of its fuel via petroleum product pipelines originating in California
- Arizona receives nearly 60% of their fuel from California
- Majority of incremental demand growth is likely to be achieved through increased shipments from California
  - But a recent expansion of the pipeline capacity between Western Texas and central Arizona helped reduce the burden on California
  - A new refinery in Arizona or new product pipeline from Texas to AZ and possibly NV could ease import growth



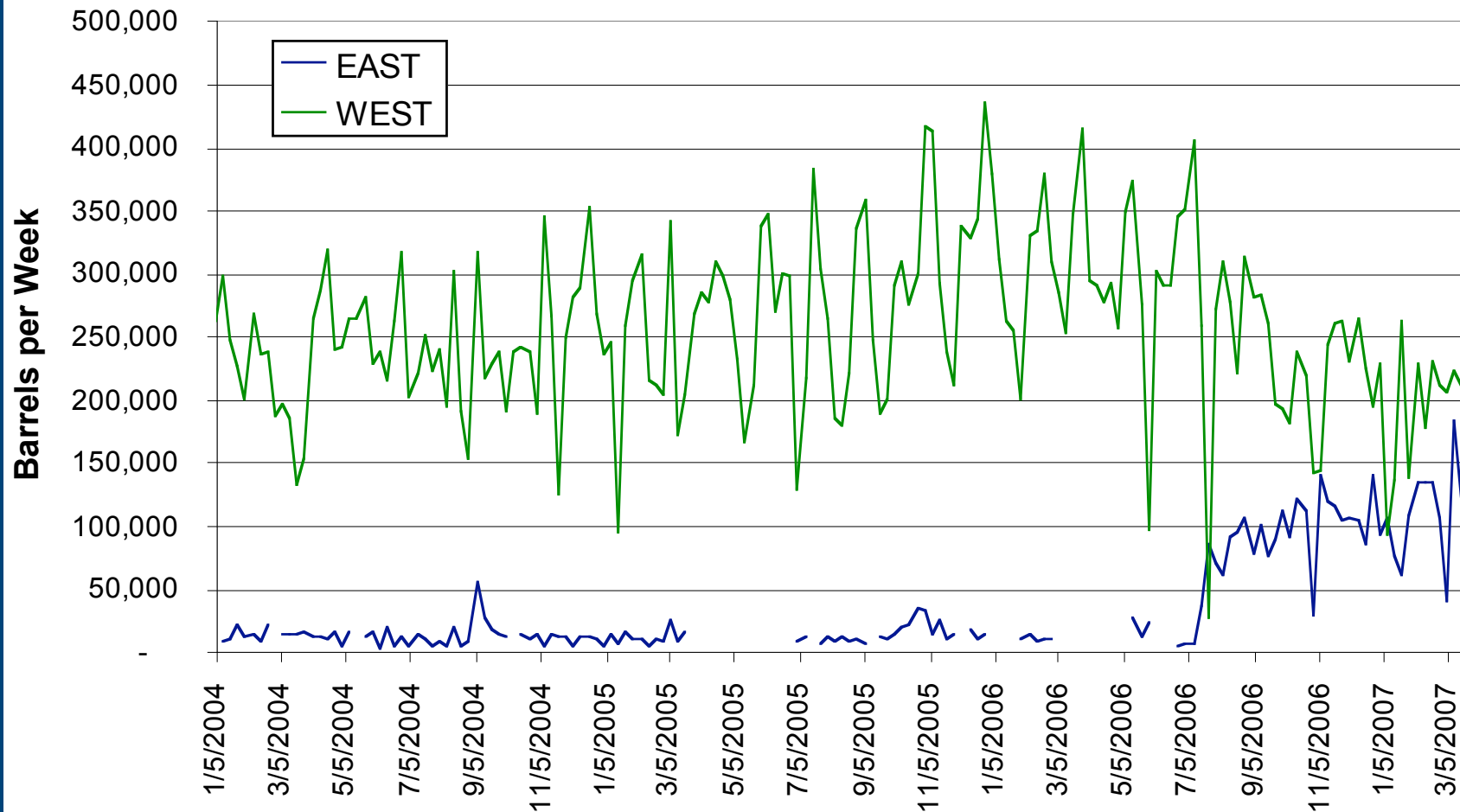
## Gasoline Movements by Pipeline to Phoenix January 2005 - March 2007



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## Diesel Movements by Pipeline to Phoenix January 2005 - March 2007



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## Next Steps

- California Energy Commission will be submitting an Integrated Energy Policy Report to the Governor by the end of 2007
- Petroleum infrastructure is one of the topics of interest that will be highlighted in this document
- Initial workshop on this topic will be conducted in Sacramento on May 8, 2007
  - Structure and assumptions used to create the demand and import forecasts will be discussed
  - Stakeholder input is encouraged



## Next Steps

- Follow-up workshop will be scheduled in Southern California some time during the first two weeks of July 2007
  - Revised crude oil forecast
  - Revised price forecast
  - Preliminary transportation fuel demand forecast
  - Preliminary transportation fuel import forecast, including neighboring states (AZ & NV) demand growth and existing throughput limitation assessment



## Petroleum Infrastructure vs. Containers

- Southern California ports are major industrial use areas that serve as conduits for movements of petroleum products and commercial goods
- The Ports of Los Angeles and Long Beach were the gateway for approximately 41% of all the containerized goods imported into the U.S. during 2005
- Container imports are forecast to grow between 8% and 10% per year over the next decade
- The handling of additional cargo containers will increase competition for spare land within the ports of LA and Long Beach



## Petroleum Infrastructure vs. Containers

- Increasing spare land competition is placing additional pressure on the ports to examine parcels that are already being used for some other non-container activity
- Petroleum terminals fall within this category
- Recent efforts to renew leases or build new petroleum import capacity have been met with resistance from
  - Local politicians
  - Community members
  - Port officials
- A continued perception that petroleum activities within the ports are an incompatible use will need to be reversed or else adequacy of state fuel supplies will be placed at risk





## Petroleum Infrastructure Significance to State

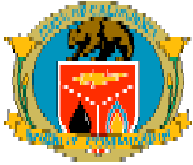
- California's economy is estimated to have generated a gross state product of over \$1.5 trillion during 2005
- Adequate supplies of transportation fuels are a necessary component of ensuring continued movement of goods through and within the state
- Loss of existing petroleum infrastructure assets could diminish access to transportation fuels resulting in:
  - Higher costs for California consumers and businesses
  - Increased risk of supply problems
  - Reduced options for re-supply during unplanned outages
  - Increased vulnerability to temporary loss of marine infrastructure assets – less redundancy or surge capability



## Petroleum Infrastructure Significance to State

- What are potential costs of a constrained petroleum infrastructure?
  - Not quantified at this time, but symptoms include significantly higher fuel costs relative to the nation
    - CA gasoline retail prices have averaged 19.4 cents per gallon higher compared to the U.S. since January 1995
    - Even higher, nearly 24.6 cents per gallon, since January 2004
    - Differential has been increasing over time
  - Higher fuel prices increase costs to consumers and businesses
    - 10 cents per gallon = \$2.4 billion per year
    - 25 cents per gallon = \$6.0 billion per year





## Summary

- California refinery production is not expected to keep pace with demand growth for transportation fuels
- California crude oil production forecasted to continue to decline
- Crude oil and clean fuel imports are forecast to increase, especially in the Los Angeles Basin
- Additional petroleum infrastructure projects will be necessary to ensure an adequate crude oil supply for the refineries and an adequate transportation fuel supply for California's consumers
- But potential problems exist for retaining existing petroleum infrastructure, as well as potential constraints to accommodating these future increased imports of crude oil and clean fuels



## Summary

- Spare land to expand petroleum infrastructure, especially in Southern California (Los Angeles and Long Beach), is hard to find
- Increased imports of non-petroleum goods (cargo containers) also require additional land, sometimes in direct competition with petroleum infrastructure
- Even though initiatives are being developed to reduce demand for traditional transportation fuels, these strategies may not appreciably impact demand over the near-term
- Therefore, demand for gasoline, diesel and jet fuel will likely continue to increase over the next decade or so, requiring an expansion of the capability to accommodate additional imports



## Contact Information



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